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INAUGURAL DISSERTATION *Thomas*

ON THE

KALMIA LATIFOLIA

AND

ANGUSTIFOLIA :

SUBMITTED TO THE EXAMINATION

OF THE

REVEREND JOHN EWING, S. S. T. P. PROVOST;

THE

TRUSTEES & MEDICAL FACULTY

OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE 27th DAY OF MAY, 1802.

FOR THE DEGREE OF DOCTOR OF MEDICINE.

By GEORGE G. THOMAS,

OF VIRGINIA, MEMBER OF THE PHILADELPHIA
MEDICAL AND CHEMICAL SOCIETIES.

“ Medicus Notitia Plantæ destitutus, de viribus
“ ejusdem nunquam juste judicavit.” LINNÆUS.

PHILADELPHIA :

PRINTED FOR THE AUTHOR, BY W. F. M'LAUGHLIN,

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1802.



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TO

DOCTOR JAMES IRWIN,

OF VIRGINIA.

SIR,

AS a mark of respect; I feel a peculiar degree of satisfaction in offering you this: the first product of a Medical education, and at the same time offer you my warmest thanks, for the preceptorial care with which you have conducted me from the earliest period of my study to the present moment.

Accept Sir, for your health, for a continuation of a life so eminently useful to many, and for your continued happiness, the warmest wishes of

Your sincere

Friend and Pupil,

THE AUTHOR.

TO
GEORGE GURLEY, D. D.
OF VIRGINIA.

SIR,

Not only inclination, but duty alone would induce me to dedicate this my first medical attempt, to you, who have so eminently distinguished yourself through life, not only in your Profession, but some public and domestic duties which adorn your character, both as a man and Christian.

With my warmest wishes for your continued health and happiness; I subscribe myself, Honoured Sir,

Your dutiful

And affectionate Grandson,

THE AUTHOR.

TO
JOHN CHURCH, M. D.

OF PHILADELPHIA.

To you, Sir, as a mark of my warmest respect; for that private attention that you have uniformly paid me, and for the general medical information I have received from you; I beg leave to dedicate the following pages.

Accept therefore, for your future welfare, and continued happiness, the warmest wishes of

Your most

Sincere friend,

GEORGE G. THOMAS.

PREFACE.

IMPRESSED with a knowledge of the duty I owe to the laws of this University, I shall offer no apology for submitting the following pages to the examination of its Honourable Faculty. I am fully sensible of the imperfections of this Essay, in consequence of the short period allotted for carrying any experiments into effect, and for arranging them; together with my inexperience and youth. These circumstances, I trust, will be attended to, not only by the Medical Professors, but by every candid reader.

EXPERIMENTAL DISSERTATION, &c.

GEOGRAPHICAL SITUATION.

THE plants which are the subject of the following experiments and observations, belong to the *Genus Kalmia*: of this *Genus* there are certainly four species; the *Kalmia latifolia* and *K. angustifolia* of Linnæus; the *K. glauca* of Aiton, and the *K. hirsuta* of Walter. *

The two former species are common in Pennsylvania, New-Jersey, and are frequently to be met with in New-York; but Mr. Kalin asserts that neither are to be met with beyond the forty-second degree of North latitude. This, however, is not the case. The *Kalmia angustifolia*, at least, is found considerably to the North of this latitude.

With respect to the *Kalmia glauca* and *K. hirsuta*, these inhabit very different tracts of country.

* *Kalmia ciliata* of Bartram.

The former is one of the *Plantæ Boreales*, or northern plants of America, being (as far as I know) exclusively confined to the northern states, as Canada, and to the Island of Newfoundland. This species, though it is only of late that it has been publicly described by L'Heritier, Aiton, and some other Botanists, was well known to the celebrated Sebastian Vaillant, many years ago. *

The *Kalmia hirsuta* or *ciliata*, is a very delicate little species of this *Genus*, for the discovery of which we are indebted to Mr. William Bartram. It is a native of Georgia and other Southern parts of the United-States, and has not hitherto, been found in any of the middle or northern parts of the union.

PLACE.

The *Genus Kalmia*, which was so named by the celebrated Linnæus, in honour to one of his most respectable and industrious pupils, the late Mr. Peter Kalm, is arranged by the Swedish Naturalist in the Xth class and 1st order of his *sexual system*, the class and order *Decandria Monogynia*. In his work on the natural orders of

* Doctor James Edward Smith.

Plants, he has referred it to the XVIII. order, called *Bicornes*, along with the *Rhododendron*, *Ledum*, and a number of other *genera*.

In the system of the learned Mr. De Jussieu, our plant is thrown into the II. order of the IX. class. To this order the French Botanist has given the name of RHODODENDRA. It comprehends, besides the *Kalmia*, the following *genera*, viz. *Rhododendron*, *Azalea*, *Rhodora*, *Ledum*, *Befaria*, and *Itea*.

DESCRIPTION.

It is not my intention to give, in this Inaugural Essay, a full description of the Plants of the *Genus Kalmia*. A concise description, however, may be expected.

The following is Linnæus's (abridged) description of the *Genus*, or family, of *Kalmia*: viz.

KALMIRA. *Cal.* 5....partitus. *Cor.* hypo-
crateriformis: limbo subtus 5....
plicato. *Caps.* 5....locularis, poly-
sperma.

Linnæus was acquainted with only two species of *Kalmia*, viz. *Kalmia latifolia*, and *K. angustifolia*. I shall, however, insert, in this place, from

Professor Gmelin's edition of the *Systema Naturæ*, the characters of all the four species which I have already mentioned, referring, at the same time, to the principal authors by whom they are figured, and described.

- | | | |
|---------------|----|---|
| Latifolia. | 1. | K. foliis ovatis, corymbis terminalibus.... <i>Trew. Ebret. t. 38. f. 1.</i> |
| Angustifolia. | 2. | K. foliis lanceolatis, corymbis lateralibus.... <i>Trew. Ebret. t. 38. f. 2.</i> |
| Glaucæ. | 3. | K. foliis oblongis lævigatis margine revolutis, corymbis terminalibus, ramulis ancipitibus..... <i>Ait. hort. Kew. p. 64. t. 8.</i> |
| Hirsuta. | 4. | K. foliis lanceolatis hirsutis, floribus axillaribus solitariis... <i>Walt. flor. carol. p. 131</i> |

Besides these four species, Gmelin mentions, on the authority of Wangenheim, a fifth species, by the name of *Kalmia polifolia*. Of this I know nothing.

In the following pages, my intention will be entirely directed to the two first mentioned species, viz. the *Kalmia latifolia* and *K. angustifolia*. These, from all the information I have been able

to collect, are much the most common species of the *Genus* in North-America. I cannot confidently assert, that they are the most worthy of our attention, in a medical or æconomical point of view.

I. KALMIA LATIFOLIA.

This shrub, one of the finest indigenous vegetables of the United States, is known by the names of Laurel, Great-Laurel, Winter-Green, Spoon-Haunch, Spoon-Wood, and Callico-Tree. It is the *Droh-too-sah* of the Wyandot, and the *Too-sah-ka*, of the Cherake Indians. It is the largest of all the known species of the *Genus*. It is generally found on the side of hills; especially, “says Mr. Kalm* on the north side, where a brook passes by; therefore on meeting with some steep places (on hills) towards a brook, or with a steep side of a hill towards a marsh, you are sure to find the *Kalmia*.” It frequently stands mixed among beech and other trees.

It generally grows about the height of seven or eight feet; but I have been informed by Professor Barton, that he has seen it twenty feet. Its trunk is generally from six to ten inches in diameter; covered with a brown, rough, and furrowed

* Travels Vol. I. p. 336.

bark; on the branches, the bark is smooth and of a light green colour; which, as it advances in age, becomes darker, and after one or two summers, arrives to the colour and appearance of that on the trunk. The wood is of a very hard and compact consistence, and on that account, it is frequently employed by Joiners and Turners, in making such work as requires the best wood; they commonly use the root, because it is yellow; the wood has a very suitable hardness and fineness, and from the centre spread as it were small rays; which are at some distance. It is also used by Farmers, in making handles for their scythes. We are informed by Mr. Kalm, that the Indians who formerly lived in these provinces, used to make their spoons and bowls of the wood of this tree; hence it derived the name of Spoon-Tree.

The leaves are ovate, terminated by smooth edges, and irregularly distributed on the tree; they retain their green colour throughout the winter; they are poisonous to some animals, particularly to sheep, oxen, cows, and horses. In the former of these animals they produce convulsions, foaming at the mouth, and death. In the latter they have invariably been found to produce great pain, when small quantities of the leaves have been eaten. Dr. Barton* mentions that

* Philosop. Transact. Vol. 5. No. 7. p. 60.

many of General Braddock's horses, a few days previous to his unfortunate defeat, were destroyed by eating the leaves and twigs of this shrub. Although the leaves of the *Kalmia latifolia* produce these disagreeable affections, on the animals just mentioned, yet we know that it is the winter food of the Deer,* the round horned Elk,† and the Pheasant.‡ Mr. Kalm says that Dogs after having eaten of the bowels of these animals, have become quite stupid, and as it were drunk; and afterwards fall so sick, that they seemed to be at the point of death. Dr. Barton observes that although the leaves are eaten with impunity, yet the flesh when taken by men and dogs, produce the most violent symptoms. The Doctor also observes, that in the winter of the years 1790 and 1791, there appeared to be such unequivocal reasons for believing, that several persons in Philadelphia, had died from eating our Pheasant; in whose crops the leaves and buds of the *Kalmia latifolia* were found, that the Mayor of the city thought it prudent, and his duty, to warn the people against the use of this bird, by a public Proclamation. I know, that, by many persons, especially by some lovers of Pheasant flesh, the circumstance just mentioned, was supposed to be without foundation. But the foundation was a

* *Cervus Virginianus* of Gmelin. † *Cervus Wapiti* of Barton.

‡ *Tetrao Cupido* of Linnæus.

solid one. This might be shewn by several well authenticated facts. The Doctor, in another place of the same paper, says he has been informed, that our Indians sometimes intentionally poison themselves with a decoction of the leaves of this *Kalmia*.

Its flowers begin to appear about the twentieth of May; during which time there is scarcely any tree that exceeds it in beauty: the flowers are innumerable, and disposed on the top of the plant in large clusters. Previous to their opening they have a fine red colour, but as they are expanded, some of them become nearly white; but the greater part preserve a light red colour. Their odour is not of the most agreeable kind. Their shape is hypocratoriform, or salver-shaped.

The flowers as well as the leaves are deleterious, and to some constitutions, even externally applied, (says Doctor Barton) prove injurious.

II. KALMIA ANGUSTIFOLIA.

This plant is known in the United-States, by the names Dwarf-Laurel, Ground-Laurel, Lamb-Kill, Ivy, &c. It grows generally on sandy heaths, or on dry poor soils, which few other plants agree with; besides Pennsylvania, New-Jersey, and New-York, it is often to be met with in Canada.

17

It generally grows from two to two and an half feet in height; its trunk is frequently about one inch in diameter, but often much less; covered with a brown smooth bark. The wood is of a moderately soft consistence, with its grain running longitudinally up the trunk; and in the middle, is to be found a large pith.

The leaves are lanceolated, entire on the edges, not nervous, and grow in a spiral form: they retain their green colour throughout winter; and when taken by animals, produce the same effects as the *Kalmia latifolia*.

The flowers make their appearance about the twentieth of May, and are equal in beauty to those of the *latifolia*, and most other plants; they grow in a pyramidal form about the extremity and sides of the stalk; and are of a fine lively purple colour; at the bottom is a circle of a deep purple, and within it a light grey colour. Their form is similar to that of the *Kalmia latifolia*.

The bees collect a deleterious honey from the flowers of both species of this plant; which produces very disagreeable symptoms in those who eat of it.

Doctor Barton, in a very valuable paper, read before the Philosophical Society, in the year 1794, on the poisonous honeys of the United-States, mentions a very singular fact respecting

the honey collected from the flowers of the *Kalmia angustifolia*.

“About twenty years since (says the Doctor) a party of young men, solicited by the prospect of gain, moved, with a few hives of bees, from Pennsylvania, into the Jerseys. They were induced to believe that the savannas of this latter country were very favourable to the increase of their bees, and consequently to the making of honey. They accordingly, placed their hives in the midst of these savannas, which were finely painted with the flowers of the *Kalmia angustifolia*. The bees increased prodigiously, and it was evident that the principal part of the honey which they made, was obtained from the flowers of the plant I have just mentioned. I cannot learn there was any thing uncommon in the appearance of the honey: but all the adventurers, who eat of it, became intoxicated to a great degree. From this experiment they were sensible that it would not be prudent to sell their honey; but, unwilling to lose all their labour, they made it into the drink well known by the name of metheglin, supposing that the intoxicating quality which had resided in the honey would be lost in the metheglin. In this respect, however, they were mistaken. The drink also intoxicated them.”

The preceeding very serious effects of the two first species of the *Genus Kalmia*, in addition to

some experiments and observations made some time since, by Professor Barton, on the *Kalmia latifolia*, have induced me to make the following series of experiments; with a view of determining its action on the arterial system, and on animals: as well as its effects in the cure of certain diseases.

EXPERIMENTS
ON THE
KALMIA LATIFOLIA.

EXPERIMENT I.

HAVING, on the 9th of March, 1802, procured some of the *Kalmia latifolia*, that had been exposed to all the preceeding winter; about four ounces of its leaves were coarsely pounded and put into a retort, with some water; to which a constant heat was applied. After some time, a light coloured fluid collected in the receiver, and upon being tasted was found nearly insipid. Nothing appeared on its surface resembling essential oil.

EXPERIMENT II.

Eight drachms of the fluid just spoken of, were taken by myself; the exhibition of which was attended with very inconsiderable effects. This experiment was repeated on a dog, with the same result.

EXPERIMENT III.

Half a drachm of the powdered leaves of the *Kalmia latifolia*, was subjected to the action of repeated quantities of alkohol. The alkohol that was first added assumed a dark green colour: this was decanted, and other quantities added, until they ceased to be coloured. After evaporating the clear and coloured liquid, it was found to contain sixteen grains of resin.

EXPERIMENT IV.

The part that remained indissoluble by the alkohol, was triturated with small and repeated quantities of water, as long as they appeared to extract any thing from it. Upon filtering and evaporating the coloured water, six grains of a gummy substance were obtained. The part that remained indissoluble by the alkohol and water, was insipid and of a grey earthy appearance. When dried it was found to weigh eight grains.

EXPERIMENT V.

One ounce of bark of the *K. latifolia* was put into about four ounces of water, and suffered to stand exposed to a moderate heat, forty-eight

hours; after which, the water was filtered, and upon being evaporated, one drachm and twelve grains of a brown, and moderately bitter extract, were obtained.

EXPERIMENT VI.

Two hours after breakfasting lightly, and being in a room at 65° of Fahrenheit; I took six grains of the green leaves bruised and triturated with a small portion of sugar: my pulse beating seventy-four strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110	120	130	140	150
76	75	73	72	72	70	70	72	70	69	68	69	66	67	68	69	69	71	73	74	74

In twenty minutes after taking the medicine, my pulse was somewhat fuller....In thirty, the fullness quite perceptible, with some confusion of my head....In fifty, the confusion of my head, and fullness of pulse had increased....In sixty, some throbbing of my temples....In seventy, the throbbing and confusion of head, had much increased....In eighty, fullness of pulse going off; with some nausea and acid eructations coming on....In ninety, nausea increased to one vomiting; pain in the head going off; but considerable weakness of the eyes, with dark spots floating before them....In one hundred, nausea and

weakness of the eyes subsiding....In one hundred and ten, the nausea had nearly subsided, and the weakness of the eyes entirely....In one hundred and twenty, nausea had subsided; but a small degree of languor remained....In one hundred and thirty, all the symptoms had nearly disappeared; and in one hundred and fifty, I felt myself nearly as before taking the medicine, and continued so the remaining part of the day.

EXPERIMENT VII.

Three hours after a light breakfast, my friend and fellow student, Mr. William E. Patterson, being in a room at 68°. of Fahrenheit, took eight grains of the green leaves bruised and triturated with a small portion of sugar and water: his pulse beating seventy-nine strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110	120
82	81	81	83	83	84	85	85	86	89	91	88	82	79	78	78	79	79

In twenty minutes after taking the medicine, he complained of pain and fullness in his head, with a small increase of fullness in his pulse.... in forty, he complained of vertigo; at which time there was an evident dilatation of the pupils of his eyes....in fifty, the vertigo and dilatation of the pupils had increased, with some tension in his

pulse....in sixty, there came on much nausea, with frequent acid eructations....in seventy, the pulse was softer, with copious perspiration; which entirely relieved the nausea...in eighty, the pulse was nearly natural; and from ninety to one hundred and twenty, continued to alternate from seventy-eight to eighty; at which time he took a little tea, with the effect of carrying off all the remaining symptoms and bringing the pulse to its natural standard.

EXPERIMENT VIII.

Two hours after a light breakfast, the temperature of my room at 67° of Fahrenheit; I took ten grains of the green leaves, prepared as in the two last experiments: my pulse beating seventy-four strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110	120	130	140	150
80	80	82	83	82	80	76	74	76	74	75	70	67	68	67	66	64	62	59	56	54

In ten minutes after taking the medicine, I felt a glow of warmth over my whole body, with a dull pain in my head....In fifteen, the pain had increased, with some fullness in my pulse....In thirty-five, I felt some nausea....In sixty, the nausea had somewhat increased....In ninety, the pain had become more acute, with slight vertigo; twenty

minutes before this, I took five grains more....in one hundred and ten, I felt a very disagreeable sensation at my stomach....in one hundred and thirty, the nausea had increased, with the pain in my head, and some languor. These symptoms continued for about two hours; at which time I took some dinner, with the effect of carrying off all the symptoms except the pain in the head; this continued the greater part of the afternoon.

EXPERIMENT IX.

Five minutes after nine o'clock A. M. my friend Mr. Patterson, being in a room of 66°. of Fahrenheit; took eight grains of the dried leaves, powdered and suspended by a small portion of sugar, in about four drachms of water: his pulse beating seventy-four strokes in a minute, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110	120
84	84	83	84	84	86	80	81	82	80	80	78	74	74	72	76	78	79

In five minutes after he had taken the medicine, he felt a glow of warmth at his stomach...in twenty, his pulse was much fuller, with some tension....in thirty, he complained of a dull pain in

his head, with a throbbing of his temples....in thirty-five, he complained of some nausea, with a very disagreeable sensation at his stomach....in fifty-five, the pain in the head was more acute, with less tension in his pulse....in seventy, he complained of much languor, this continued until the ninetieth minute, when he took some drink, which relieved the languor; and in one hundred and twenty minutes, his pulse was at seventy-nine, and continued so the remaining part of the day.

EXPERIMENT X.

Twenty minutes before twelve o'clock, the temperature of my room at 66°. of Fahrenheit, I took ten grains of the leaves dried and powdered, with a small portion of sugar; my pulse beating seventy-four strokes in a minute, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110	120	130
80	84	84	80	76	76	76	72	68	66	64	64	64	64	64	66	66	64	64

In ten minutes after I had taken the medicine, there was a sensation of warmth throughout my whole body, with a dull pain in my head....in twenty, my pulse had increased in fullness, with some tension and throbbing of my temples....in

twenty-five, some nausea....in fifty-five, the nausea had increased to frequent acid eructations, with considerable languor, and a very acute pain in my head; these symptoms continued to increase until the one hundred and thirtieth minute, when I took some dinner, which relieved all the symptoms except the pain in the head; this continued all the afternoon and evening of the same day.

EXPERIMENT XI.

Two hours after a light breakfast, Mr. Patterson, being in a room at 71° . of Fahrenheit, took two drachms of the decoction, prepared by placing one ounce of the leaves in eight ounces of water, and boiling it down to four ounces; his pulse beat seventy-nine, its natural standard.

In the course of this experiment, there was

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90
79	78	79	83	87	86	87	87	85	83	83	79	79	79	79

nothing peculiar, except some affection of his stomach, which came on about the forty-fifth minute.

EXPERIMENT XII.

Three hours after a light breakfast, the temperature of my room, at 71° . of Fahrenheit, I took

three drachms of the decoction, prepared as above; my pulse beating seventy-four strokes in a minute, its natural standard.

5	10	15	20	25	30	35	40	45	50	60	70	80	90	100	110	120	130
74	78	79	82	82	84	84	80	79	76	70	70	66	66	66	64	64	64

In thirty minutes after I had taken the medicine, my pulse was very full and tense, with much throbbing of my temples, which continued until the fortieth minute, when my stomach became much affected, with frequent acid eructations and a very acute pain in my head; these symptoms continued to encrease for one hour, when I drank some tea; after this all the symptoms, except the pain in the head, gradually disappeared: this continued all the succeeding evening.

EXPERIMENT XIII.

One hour after breakfast, Mr. Patterson, being in a room at 69°. of Fahrenheit, took one drachm of the tincture, prepared by digesting eight ounces of alkohol and water, with about two ounces of the leaves, for fifty-six hours: his pulse beating seventy-nine strokes in a minute, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100
83	81	81	83	87	89	89	87	89	90	87	86	83	80	79	79

After taking the medicine there was no perceptible change, except the frequency of his pulse, until the thirtieth minute, when there was much tenston in his pulse, and pain in his head; this continued about twenty minutes; after this time his pulse began gradually to fall, and at the ninetieth minute was at seventy-nine, its usual standard.

EXPERIMENT XIV.

Two hours after breakfast, the temperature of my room at 69°. of Fahrenheit, I took eight grains of the extract procured in the fifth experiment; my pulse beating seventy-four strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100	110
80	78	78	79	80	74	72	71	72	74	74	70	68	64	60	63	66

In twenty minutes after taking it my pulse was much more full, with a dull pain in my head and throbbing of my temples....in thirty-five, there was much nausea, which continued twenty minutes; after this some languor came on and continued until the one hundredth minute, when my pulse began to rise, and in one hundred and thirty minutes, was at seventy-four.

EXPERIMENT XV.

Two hours after a light breakfast, Mr. Paterson, being in a room at 70°. of Fahrenheit, took two drachms of the tincture prepared as above: his pulse at seventy-nine, its natural standard.

5	10	15	20	25	30	45	50	55	60	70	80	90	100	110
78	82	82	81	80	84	86	83	80	77	75	75	78	79	79

In ten minutes after he had taken the medicine, there was much fullness in his pulse, and some tension....in twenty, the tension was very great, and continued to increase with much pain in the head and some vertigo, until the thirtieth minute, when he lost about six ounces of blood; this immediately reduced the fullness and tension of the pulse, and in one hundred minutes it was quite natural. The blood that was taken had no other peculiar appearance than a thin buffy coat.

EXPERIMENT XVI.

Three hours after breakfasting lightly, the temperature of my room at 70°. of Fahrenheit, I took twelve grains of the extract obtained in the

fifth experiment; my pulse beating seventy-four, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90
74	76	76	78	78	76	75	72	72	70	68	68	62	62	63

In thirty minutes after taking the medicine, I had a very severe head ache, with a very full pulse...in forty, my pulse was much softer, with very great nausea; this continued increasing until the fiftieth minute, when it was with the greatest difficulty I could keep from vomiting: the nausea and inclination to vomit continued about forty minutes; at the end of this time my pulse began to rise, and in half an hour was at seventy-four.

EXPERIMENT XVII.

G. G. 33 years of age, affected with a trembling of his hands, from a fit of intoxication, took eight grains of the resin procured in the third experiment: his pulse beating seventy-eight strokes in a minute,

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90
84	86	86	88	91	92	89	92	90	84	83	80	78	78	78

In twenty minutes after taking the medicine, his pulse was very full, with some tension....in

thirty-five, the tension was very great, with some flushing of his face. About this time he was completely relieved of the trembling of his hands, and continued so some time after the experiment.

EXPERIMENT XVIII.

Nearly two drachms of the decoction prepared as in the eleventh experiment; were given to a dog about eight weeks old. In about three minutes after taking it, he shewed evident marks of uneasiness....in five, the uneasiness had much increased....in seven, he vomited about a spoonful of saliva mixed with a fluid; which upon tasting I discovered to be a part of what he had taken....in ten, it was with difficulty he could walk....in twelve, there was a discharge of fœces; with increased respiration, and a total loss of motion in his hind feet and legs....in fifteen the efforts to vomit were very great, with frequent eructations and a copious flow of saliva; the uneasiness at this period was so great, as to occasion constant howling. These symptoms continued to increase until the fortieth minute; when a complete paralysis of the extremities and sphincter ani took place, with copious and involuntary discharges of fœces, attended with stupor and laborious respi-

ration....in seventy, stupor so great, that the most powerful stimuli would not rouse him: even the actual cautery...in one hundred, violent convulsions came on; these continued to recur every eight or ten minutes, until the one hundred and seventieth minute; about which time he expired.

On dissection the veins and gall bladder were found much distended, with evident marks of inflammation in the stomach and whole tract of intestines; in both of which a number of round worms were found; from three to six inches in length, all of which were dead. On opening the cranium, the veins were found very turgid, with a larger quantity than natural of bloody serum in the ventricles.

EXPERIMENT XIX.

About one ounce of the same decoction was given to a grown dog; immediately after the exhibition of which, he vomited about one half of it....in about ten minutes after this time, there came on almost incessant vomitings; attended with very great uneasiness and some howling; these symptoms continued for twenty-five or thirty minutes; about which time he became relieved and continued so the remaining part of the

day; but refused to eat any thing that was offered him.

EXPERIMENT XX.

One ounce of the tincture prepared as in the thirteenth experiment, was given to a full grown dog; which brought on instantaneous death.

On dissection, no part was discovered to be much diseased, except the stomach; this was very much contracted, and upon being opened, a number of rugæ were found; every one of which, with its whole internal surface, had every appearance of approaching gangrene.

EXPERIMENT XXI.

About two drachms of the tincture, were given to a grown dog: in ten minutes after which he exhibited evident marks of uneasiness, with a lolling out of his tongue and a copious flow of saliva; these symptoms continued to increase, with some difficulty in walking, until the fortieth minute; about which time he vomited copiously, and in a few minutes after voided some fœces....in sixty, he had become almost senseless, with a considerable dilatation of the pupils of his eyes; and in

eighty, he was quite blind and stupid, with a complete paralysis of his extremities, and frequent involuntary discharges of fœces. He continued in this situation about four hours; after which time he began gradually to recover, and in about five or six hours more, was apparently well; except a trembling similar to that in a man, after a fit of intoxication; this continued nearly all the succeeding day; though it finally went off, and on the next day he was perfectly well.

EXPERIMENT XXII.

One ounce of the decoction prepared as before, was given to a dog about twelve months old....in ten minutes after taking the medicine, violent commotions of the abdominal muscles took place, with frequent ineffectual efforts to vomit...in twenty, vomited copiously, and in twenty-five, had a large evacuation per ano, with some difficulty of walking, and a very copious flow of saliva; this continued for twenty-five or thirty minutes, in which time he discharged nearly four ounces of saliva, and in sixty, it was with the greatest difficulty he could walk...in seventy, the flow of saliva was somewhat diminished, but the vomiting had increased to copious discharges of a thick mucus substance...in eighty-six some stu-

por came on, succeeded in a few minutes, by a very sound sleep, which continued about fifty-seven minutes, when he awoke apparently much relieved, and in a few hours was entirely so.

EXPERIMENT XXIII.

Half a drachm of the powdered leaves were mixed with a small portion of hogs-lard, and given to a dog about eight months old. In fifteen minutes after taking the medicines, he vomited about one third of it; after this time there was no perceptible appearance of any uneasiness, until the one hundred and sixth minute, when a copious flow of saliva came on, succeeded by several large evacuations from the stomach, with much difficulty of walking, and constant falling about; these symptoms continued to alternate for thirty-six minutes, when he became comatose and remained, in that state, seventy three minutes; about the end of which time he awoke without any of the above symptoms, and upon offering him food he ate greedily. Might not the operation of the above medicine be protracted by the lard? In order to ascertain this, I made the following experiment.

EXPERIMENT XXIV.

Two drachms of the powdered leaves were suspended by a small portion of sugar, in about one ounce of water, and given to the same dog that the last experiment was made on. In ten minutes after he had taken it, a copious flow of saliva came on, succeeded in a few minutes by violent vomiting and a great difficulty of walking; these symptoms continued to increase, with several copious discharges of urine, for fifty minutes, when his extremities were completely paralised, and respiration very laborious: he continued in this state about three hours; after which time he gradually and finally recovered. From this it will appear, that the lard must have suspended the operation of the dose, in the last experiment.

EXPERIMENT XXV.

Half past twelve o'clock, I gave to a grown dog six drachms of the tincture, prepared as in the other experiments. In fifty-three seconds after he had taken the medicine, there was a complete paralysis of the whole muscular system, with a very great dilatation of the pupils of his eyes: his heart continued to pulsate, with every appear-

ance of oppression, until the twentieth minute; when he expired without a struggle.

On dissection, the internal coat of the stomach was found of a livid appearance, and the *pylorus* so contracted that it would not admit the point of the smallest probe. The veins throughout the whole body were found distended twice their natural size, and on being opened, the blood was found not to coagulate or dissolved.

EXPERIMENT XXVI.

One ounce of the decoction was given as an injection, to a grown dog; immediately after which he exhibited every mark of the greatest uneasiness, with a violent tenesmus; this continued until the twenty-sixth minute; when his hind feet appeared to be slightly affected, and in thirty-five, it was with the greatest difficulty he could walk: he continued in this state about sixty minutes; after which he gradually recovered.

EXPERIMENT XXVII.

Two ounces of the decoction were injected into the rectum of another dog; immediately after which, a violent tenesmus came on; succeeded,

in ten or fifteen minutes, by several discharges of fœces....in twenty-five, all the symptoms in the last experiment had appeared; only in a more violent degree, and continued to increase until the thirty-seventh minute, when there was a complete paralysis of his hind feet and legs, with some affection of his whole body: these symptoms continued about two hours, after which they began to subside; and in two or three hours more he was apparently well, and ate greedily.

EXPERIMENT XXVIII.

Four drachms of the saturated tincture were injected into the rectum of a half grown dog; immediately after which he made frequent ineffectual efforts to void fœces; attended with incessant howling for fifteen or twenty minutes, when he appeared somewhat deranged, and tottered on attempting to walk...in twenty-seven, he had lost all use of his feet and legs, and in thirty-seven, he was nearly motionless, but recovered in the course of three hours after.

EXPERIMENT XXIX.

One ounce of the tincture was injected into the rectum of the same dog that the last experi-

ment was made on. In a few minutes after the injection, the most violent symptoms came on; though finally went off without occasioning death. The same experiment was several times made with increased quantities, but always without producing death.

EXPERIMENT XXX.

Twelve grains of the extract prepared in the fifth experiment, were given to a dog twelve months old; in a few minutes violent and ineffectual efforts to vomit came on, with some difficulty of walking; both of which continued to increase about thirty minutes; at the end of which time his respiration had become very quick and laborious, with disturbed circulation, constant reeling about and howling: these symptoms continued without much alteration two or three hours, and finally went off without producing death.

EXPERIMENT XXXI.

One scruple of the extract was given to the same dog that the last experiment was made on. In a few minutes, he made violent and ineffectual efforts to vomit, attended in a quarter of an hour with great uneasiness, constant howling, and frightful distortions of his whole body; these

symptoms continued to increase, with great commotions of the diaphragm and thorax, for two or three hours about which time he expired.

On dissection, the external and internal coats of the stomach, with the whole abdominal viscera, were found very much inflamed, the blood dissolved, with a great determination of bloody serum, to the brain.

EXPERIMENT XXXII.

Nearly two drachms of the decoction were injected into the jugular vein of a dog, immediately after which he made one or two ineffectual efforts to walk, succeeded in a few minutes, by a violent contraction of his diaphragm, and several fruitless attempts to vomit, with the appearance of something regurgitating into his mouth, which was repeatedly swallowed. In ten minutes, he had lost all use of himself: his circulation continued, though much oppressed, with interrupted respiration, until the twenty-ninth minute, when he expired. On dissection, nothing peculiar presented itself.

EXPERIMENTS
ON THE
KALMIA ANGUSTIFOLIA.

EXPERIMENT I.

TO half a drachm of the powdered leaves of the *Kalmia angustifolia*, repeated quantities of alcohol were added; as long as they appeared to extract any thing from the powder. The clear liquid was afterwards evaporated, and found to contain seventeen grains of resin.

EXPERIMENT II.

Small and repeated quantities of water were added to the part that was indissoluble by the alcohol, as long as they assumed any colour. After filtering and evaporating the coloured water, three grains of a gummy matter were obtained. The indissoluble part by the alcohol and water was insipid, and of a light earthy appearance. When dried, it was found to weigh nine grains.

EXPERIMENT III.

Two hours after a light breakfast, the temperature of my room at 63°. of Fahrenheit, I took six grains of the leaves of the *Kalmia angustifolia*, suspended by a small portion of sugar in about one ounce of water; my pulse beating seventy-four strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80
78	78	77	75	71	70	70	70	71	72	72	73	74	74

In fifteen minutes after taking the medicine, my pulse was fuller, with a dull pain in my head, and throbbing of my temples; these symptoms continued without much alteration until the forty-fifth minute, when they began to subside, and in seventy, my pulse had risen to seventy-four.

EXPERIMENT IV.

Three hours after breakfast, Mr. Patterson, being in a room at 63°. of Fahrenheit, took eight grains of the leaves prepared as before; his pulse beat seventy-nine strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70
83	84	80	82	80	77	74	74	75	77	77	79	79

In fifteen minutes after taking the medicine his pulse was fuller, with some tension...in thirty, tension and fullness of pulse very great; about this time some pain in the head came on, and continued to increase until the forty-fifth minute; after which all the symptoms began to subside, and in one hour his pulse was at its natural standard.

EXPERIMENT V.

Twenty minutes after one o'clock, G. G. thirty-three years of age, affected with a trembling of his hands, from an intemperate use of ardent spirits; one hour and an half after a light dinner, took twelve grains of the leaves prepared as before; his pulse beat seventy-eight strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70	80	90	100
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84	89	93	96	97	96	95	92	89	88	85	83	80	78	78	78

In twenty minutes after he had taken the medicine, his pulse was fuller, with much tension... in forty, the tension had diminished, but the fullness increased, with some flushing of the face and pain in the head: he was now completely relieved of his trembling, and continued so until the succeeding morning.

EXPERIMENT VI.

One hour after a light breakfast, the temperature of my room at 69° . of Fahrenheit, I took ten grains of the leaves suspended in water; my pulse beating seventy-four strokes in a minute.

5	10	15	20	25	30	35	40	45	50	55	60	70
79	82	78	76	75	73	70	71	71	72	74	74	74

In twenty-five minutes after I had taken the medicine, my pulse was very tense and full, with some pain in the head...in thirty-five, the pain in the head had much increased, with a slight vertigo and a disagreeable sensation throughout my whole body...in fifty-five, all the symptoms had nearly subsided, except the pain in the head; this continued the greater part of the day; during which time I had several slight returns of the vertigo.

EXPERIMENT VII.

Two hours after breakfasting, Mr. Patterson, being in a room at 69° . of Fahrenheit, took two drachms of a decoction prepared in the same manner as that from *Kalmia latifolia*; his pulse beating seventy-four strokes in a minute, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70
83	82	80	79	80	82	82	80	80	78	79	79	79

The medicine in this experiment had little other effect than increasing the pulse, in force and fullness, with some pain in the head and slight nausea.

EXPERIMENT VIII.

Two hours after a light breakfast, the temperature of my room at 69°. of Fahrenheit, I took eight grains of the resin that was obtained in the first experiment; my pulse at seventy-four, its natural standard.

5	10	15	20	25	30	35	40	45	50	55	60	70	80
78	79	79	82	82	80	79	77	76	74	74	72	74	74

In fifteen minutes after taking the medicine, my pulse was very tense and full, with some pain in the head...in thirty, the tension was less, but the fullness and pain in the head increased; and in fifty, all the symptoms had subsided, except the pain in the head; this continued the greater part of the day.

EXPERIMENT IX.

Three hours after breakfast, my worthy friend Mr. Patterson, being in a room at 69°. of Fahrenheit, took two drachms of the tincture, prepared in the same manner as that of the *K. latifolia*; his pulse beat seventy-nine strokes in a minute, as usual.

5	10	15	20	25	30	35	40	45	50	55	60	70	80
83	85	86	86	87	89	87	87	84	83	81	80	79	79

In fifteen minutes after he had taken the medicine, his pulse was much fuller, with some tension, and a sensation of warmth throughout his whole body, but particularly at his stomach...in thirty, the tension was very great...in fifty, there was less tension and fullness in his pulse; and in sixty, all the symptoms had nearly subsided.

EXPERIMENT X.

One ounce of the decoction made in the seventh experiment, was given to a dog about twelve months old...in six minutes after he had swallowed it, violent and very copious vomiting ensued; this, with some howling and great commotion of the *thorax*, continued forty minutes, when he began to recover, and in three quarters of an hour, was quite well.

EXPERIMENT XI.

About ten drachms of the decoction were given to a half grown dog, which in three minutes, brought on very copious vomiting of a thick mucus substance, this continued without much change thirty minutes, when he was discovered to stagger on attempting to walk. About the fortieth minute, he had fallen into a sound sleep, and continued in that state thirty-six minutes; at the end of that time he awoke apparently well.

EXPERIMENT, XII.

On the same day of the last experiment, half an ounce of the decoction was given to a full grown cat, immediately after the exhibition of which, frequent and violent ineffectual efforts to vomit came on, attended in a few minutes with a copious flow of saliva; these symptoms continued to increase about thirty minutes, during which time she discharged nearly six ounces of saliva, and had several evacuations *per ano*. In forty minutes, there was great difficulty in walking, with constant mewing and falling about: she remained in this state nearly three quarters of an hour;

when she began to mend, and in two hours after had nearly recovered.

EXPERIMENT XIII.

Half a drachm of the green leaves was suspended, by a small portion of sugar, in about one ounce of water, this was given to a half grown dog. In a few minutes after its exhibition, constant howling and very copious vomiting came on, this in thirty minutes, had increased to several vomitings of a stercoraceous matter, and some staggering on attempting to walk. In sixty, he was completely senseless, with a total loss of motion in his hind feet and legs; he remained in this state nearly fifty minutes, when his senses, with the use of his feet and legs, began to return, and in one hour more were completely recovered; but refused to eat any thing that was offered him.

EXPERIMENT XIV.

About two drachms of the tincture prepared in the ninth experiment; were given to a grown cat, immediately after which, a general paralysis ensued, with a total loss of sensibility: she conti-

nued to respire nearly four hours, when she expired without a struggle.

On dissection, the stomach and whole abdominal viscera were found very much inflamed; the blood dissolved, and on opening the cranium, its blood-vessels appeared very turgid, with much inflammation throughout the whole surface, and some effusion of a watery appearance in the ventricles.

EXPERIMENT XV.

One ounce of the tincture, prepared as above, was given to a large dog. In thirty seconds after which, he was completely paralysed and senseless, but continued to breathe nearly three minutes, when he expired without the smallest effort. On dissection, nothing peculiar presented itself, except a very dark appearance of the blood, with a preternatural distention of the whole sanguiferous system, and a very contracted stomach.

EXPERIMENT XVI.

On the same day of the last experiment, nearly two drachms of the tincture were given to a half grown dog; immediately after which, a very

copious flow of saliva came on, and continued nearly thirty minutes; during this time he discharged upwards of four ounces of saliva. In forty minutes, his hind feet appeared to be slightly affected on attempting to walk; but in one hour after, all the symptoms had nearly subsided, and he appeared as before taking the medicine.

EXPERIMENT XVII.

Two drops of the tincture were let fall into the mouth of a full grown mouse. Convulsions were the almost immediate consequence, succeeded in a few minutes by a general paralysis, and in half an hour, death. On dissection, nothing peculiar presented itself, except a very contracted stomach.

EXPERIMENT XVIII.

Nearly four drachms of the tincture were given to a half grown dog. In a few minutes after its exhibition, very copious and frequent vomiting of a thick mucus substance came on, attended in a short time with constant howling and running about...in fifteen, it was with the greatest difficulty he could walk; and in twenty, he was completely paralysed and almost senseless. He re-

mained in this state ninety-three minutes; after which time, he appeared somewhat better, and with the greatest difficulty, recovered in the course of the day.

EXPERIMENT XIX.

Two days after the last experiment, about six drachms of the tincture were given to the same dog. In a few minutes he made several violent and ineffectual efforts to vomit, reeling on attempting to walk, and in five minutes lost all use of himself, breathed laboriously, and in fifty-three minutes died without any symptom of pain. On dissection, the blood-vessels were found distended as usual, with some contraction of his stomach and larynx.

From the preceeding experiments, it will appear that the *Kalmia latifolia* and *K. angustifolia*, are very similar in their operations. On a comparison of the first and second experiments of the latter, with the first of the former, I am induced to believe, that the latter is the most active. This will likewise be discovered by comparing the twenty-fifth experiment of the former with the nineteenth of the latter.

There are one or two experiments, in which the frequency of the pulse has been increased by

the *Kalmia latifolia* more than by the *Kalmia angustifolia*; but we see that from the same dose of the latter, there has invariably been a greater increase of fullness and force. Both of which are amongst the first effects of stimulant medicines.

After admitting the *Kalmia angustifolia* to be more active than the *Kalmia latifolia*, we can easily explain why it should be so, by comparing the first experiment of the former with the third of the latter. In these experiments we find, that, from half a drachm of the leaves of the latter, there were but sixteen grains of resin obtained, when there were seventeen obtained from an equal portion of the leaves of the former. Hence it appears, that the resin is the most active part of these plants. This derives farther confirmation by comparing the experiments made with the decoction and those made with the tincture.

Their primary effects on the pulse, when taken internally, are to increase its fullness, force, and frequency; and when taken in moderately large doses, they produce nausea, pain in the head, flushing of the face, vertigo, dilatations of the pupils of the eyes, increased flow of saliva and intoxication: these, after continuing some time, are succeeded by convulsions, loss of motion, stupor, and finally death. The *Kalmia latifolia* and *K. angustifolia*, like electricity and some of the

most powerful stimulants, have always produced instant death in large or excessive doses.

In entering upon an explanation, with respect to their *modus operandi*, I feel myself quite deficient. But from the different experiments and following cases, together with their analogical operations to those of *Opium*, *Camphor*, *Hyosciamus*, *Datura*, *Conium Maculatum*, &c. I feel myself justifiable in agreeing with professor Barton,* that they may with the utmost propriety be classed amongst the most active *stimuli*.

I might have gone on with comparative operations of the *Kalmia latifolia* and *K. angustifolia* to the above medicines, which are universally admitted as stimulants; but as there is little theory requisite in the explanation of experiments, I must content myself with a relation of their subsequent

MEDICAL PROPERTIES.

Our knowledge respecting the medical properties of some of our most active plants, and particularly these two species of *Kalmia*, has been so limited, that I have been induced to attempt their probable utility or inefficacy in the cure of disease. In the use of the *Kalmia latifolia*, I have

* Collections for a Materia Medica, &c.

been preceded by professor Barton, who has administered different preparations of this vegetable, both externally and internally, in various cases, particularly *tinea capitis*, *herpes* of the skin, and old venereal ulcers; in all of which he has found it an important medicine.

DIARRHÆA.

S. S. fifty-six years of age, was much reduced by a diarrhæa of eight weeks continuance. His pulse beating eighty-six strokes in a minute; March the 26th, was put on a decoction of the *Kalmia latifolia*, made as before; of this he took half a drachm six times a day...27th, pulse seventy, and much fuller than yesterday, says he feels himself stronger, and rested last night better than usual....28th, pulse ninety, continues gaining strength, and had no occasion to rise to stool last night...29th* complains of pain in the head, with vertigo when he attempts to rise, with a singing noise in his head; in other respects, better...30th, no perceptible difference in the pulse; this morning diminished the dose to half a drachm four times a day, on account of the affection of his head...31st, vertigo somewhat relieved...April 1st, relieved of vertigo, but complains of a slight pain in the head...2d, all the symptoms had sub-

* He complained of disagreeable dreams on the nights of the 29th and 30th.

sided, and on the third he was discharged, perfectly cured.

PSORA.

S. B. forty-five years of age, affected with itch of six weeks standing; was directed to wash the eruption three or four times a day, with a decoction of the *Kalmia latifolia*. Upon making use of the medicine he complained of much pain and irritation, which he compared to the pricking of a number of thorns; this sensation continued to return on every application, for two or three days, when the eruption had nearly subsided, and on the sixth day he was discharged perfectly cured.

C. S. twenty years of age, with itch of some time standing; was directed to wash the eruption four times a day, with the decoction of the *Kalmia latifolia*; she complained of very severe pain on every repetition of the medicine, for nearly three days, when the eruption was much better, and on the seventh day had entirely disappeared.

The above remedy was prescribed for three other patients labouring under the same complaint, all of whom were cured in the course of seven or eight days; previous to which they all complained of much pain on every repetition of the wash.

B. A. thirteen years of age, affected with itch of nearly six weeks continuance; was directed to wash the eruption, three or four times a day, with a decoction of the *Kalmia angustifolia*; the use of which brought on so much pain and irritation, that it was with difficulty he could be persuaded to continue the wash, but on so doing, the eruption was much diminished in three or four, and on the tenth day he was perfectly cured.

S. C. and three children, with itch, made use of the *Kalmia latifolia*, as a wash for ten or twelve days, when two of them were quite well; and the other two had every appearance of being so, in a few days. For two or three days, the pain was so severe as to occasion the children to cry incessantly for some time after each application of the medicine.

TINEA CAPITIS.

D. M'M. eleven years of age, affected with *Tinea Capitis* of six months standing; after using other remedies with very inconsiderable effects, was on the twenty-third of March, put on the use of the *Kalmia latifolia*; of this he took two grains of the powdered leaves, twice a day, and washed his head with the decoction every four hours.

He continued this practice six days, without any alteration; the wash creating a very severe pain on each application. On the thirteenth the medicine was increased to three grains, three times a day: this was continued ten days, without producing any change. On the eleventh of April, he was directed to take four grains three times a day, and dress his head with an ointment prepared from the leaves. In the course of three days, the eruption was much better, with a slight inflammation throughout the whole surface of the head, some vertigo and an evident dilatation of the pupils of his eyes. On the nineteenth, all the symptoms had nearly subsided, and he had every appearance of being well in a few days.

P. M. nine years of age, affected with *Tinea Capitis* of nine months standing; during which time he had made use of numerous remedies with little effect. On the twenty-eighth of March, was directed to wash his head four times a day, with a decoction of the *Kalmia latifolia*; he continued this practice nearly thirteen days, with little other effect, than a slight pain in the part, whenever he made use of the wash. On the thirteenth of April, he omitted the decoction, and made use of the ointment; two days after which he had much mended, and on the eighteenth, was infinitely better, and had every appearance of getting well in a short time.

INTERMITTING FEVER.

I have been informed, by a very respectable and intelligent gentleman, that he cured two of his children of intermittent fever, by giving them ten or twelve grains of the powdered leaves of the *Kalmia latifolia*; an hour before the commencement of the cold stage. In one of them it produced very alarming symptoms such as vomiting, vertigo and delirium. In the other a very considerable affection of the stomach was brought on.

Dr. Barton informs us,* that he has given the powder of this plant, internally, in a case of fever. The Doctor likewise observes, in his lectures, that he has been informed, that an empirical practitioner, in Lancaster county, had frequently administered it, internally, in cases of fever. It is to be observed, however, that this practitioner was accustomed to combine a portion of the sugar of lead with the *Kalmia*, which he used in these cases.

* Collections for a Materia Medica, &c.

It now remains that I acknowledge my thanks to the Medical Professors of this University, for the inestimable information I have received from them. To Professor Barton, I beg leave to address myself, in a particular manner, not only for his uniform politeness and attention towards me, but for some invaluable favours, which alone entitle him to my best wishes for a continuation of that honour and happiness which his indefatigable exertions in the diffusion of knowledge, will ever claim.

THE END.

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